

for purposes of estimating probability of causation.

(c) All secondary and unspecified cancers of the lymph node (ICD-9 code 196) shall be considered secondary cancers (cancers resulting from metastasis of cancer from a primary site). For claims identifying cancers of the lymph node, Table 1 in § 81.23 provides guidance for assigning a primary site and calculating probability of causation using NIOSH-IREP.

#### § 81.22 General guidelines for use of NIOSH-IREP.

DOL will use procedures specified in the NIOSH-IREP Operating Guide to calculate probability of causation estimates under EEOICPA. The guide provides current, step-by-step instructions for the operation of IREP. The procedures include entering personal, diagnostic, and exposure data; setting/confirming appropriate values for variables used in calculations; conducting

the calculation; and, obtaining, evaluating, and reporting results.

#### § 81.23 Guidelines for cancers for which primary site is unknown.

(a) In claims for which the primary cancer site cannot be determined, but a site of metastasis is known, DOL will calculate probability of causation estimates for various likely primary sites. Table 1, below, indicates the primary cancer site(s) DOL will use in NIOSH-IREP when the primary cancer site is unknown.

TABLE 1

Primary cancers (ICD-9 codes<sup>3</sup>) for which probability of causation is to be calculated, if only a secondary cancer site is known. "M" indicates cancer site should be used for males only, and "F" indicates the cancer site should be used for females only. A glossary of cancer descriptions for each ICD-9 code is provided in appendix A to this part.

Secondary cancer (ICD-9 code)	ICD-9 code of likely primary cancers
Lymph nodes of head, face and neck (196.0) .....	141, 142 (M), 146 (M), 149 (F), 161 (M), 162, 172, 173, 174 (F), 193 (F).
Intrathoracic lymph nodes (196.1) .....	150 (M), 162, 174 (F).
Intra-abdominal lymph nodes (196.2) .....	150 (M), 151 (M), 153, 157 (F), 162, 174 (F), 180 (F), 185 (M), 189, 202 (F).
Lymph nodes of axilla and upper limb (196.3) .....	162, 172, 174 (F).
Inguinal and lower limb lymph nodes (196.5) .....	154 (M), 162, 172, 173 (F), 187 (M).
Intrapelvic lymph nodes (196.6) .....	153 (M), 154 (F), 162 (M), 180 (F), 182 (F), 185 (M), 188.
Lymph nodes of multiple sites (196.8) .....	150 (M), 151 (M), 153 (M), 162, 174 (F).
Lymph nodes, site unspecified (196.9) .....	150 (M), 151, 153, 162, 172, 174 (F), 185 (M).
Lung (197.0) .....	153, 162, 172 (M), 174 (F), 185 (M), 188 (M), 189.
Mediastinum (197.1) .....	150 (M), 162, 174 (F).
Pleura (197.2) .....	150 (M), 153 (M), 162, 174 (F), 183 (F), 185 (M), 189 (M).
Other respiratory organs (197.3) .....	150, 153 (M), 161, 162, 173 (M), 174 (F), 185 (M), 193 (F).
Small intestine, including duodenum (197.4) .....	152, 153, 157, 162, 171, 172 (M), 174 (F), 183 (F), 189 (M).
Large intestine and rectum (197.5) .....	153, 154, 162, 174 (F), 183 (F), 185 (M).
Retroperitoneum and peritoneum (197.6) ...	151, 153, 154 (M), 157, 162 (M), 171, 174 (F), 182 (F), 183 (F).
Liver, specified as secondary (197.7) .....	151 (M), 153, 154 (M), 157, 162, 174 (F).
Other digestive organs (197.8) .....	150 (M), 151, 153, 157, 162, 174 (F), 185 (M).
Kidney (198.0) .....	153, 162, 174 (F), 180 (F), 185 (M), 188, 189, 202 (F).
Other urinary organs (198.1) .....	153, 174 (F), 180 (F), 183 (F), 185 (M), 188, 189 (F).
Skin (198.2) .....	153, 162, 171 (M), 172, 173 (M), 174 (F), 189 (M).
Brain and spinal cord (198.3) .....	162, 172 (M), 174 (F).
Other parts of nervous system (198.4) .....	162, 172 (M), 174 (F), 185 (M), 202.
Bone and bone marrow (198.5) .....	162, 174 (F), 185 (M).
Ovary (198.6) .....	153 (F), 174 (F), 183 (F).
Suprarenal gland (198.7) .....	153 (F), 162, 174 (F).
Other specified sites (198.8) .....	153, 162, 172 (M), 174 (F), 183 (F), 185 (M), 188 (M).

<sup>3</sup>The International Classification of Diseases Clinical Modification (9th Revision) Volume I&II. [1991] Department of Health

and Human Services Publication No. (PHS) 91-1260, U.S. Government Printing Office, Washington D.C.

(b) DOL will select the site producing the highest estimate for probability of causation to adjudicate the claim.

#### § 81.24 Guidelines for leukemia.

(a) For claims involving leukemia, DOL will calculate one or more probability of causation estimates from up to three of the four alternate leukemia risk models included in NIOSH-IREP, as specified in the NIOSH-IREP Operating Guide. These include: “Leukemia, all types except CLL” (ICD-9 codes: 204–208, except 204.1), “acute lymphocytic leukemia” (ICD-9 code: 204.0), and “acute myelogenous leukemia” (ICD-9 code: 205.0).

(b) For leukemia claims in which DOL calculates multiple probability of causation estimates, as specified in the NIOSH-IREP Operating Guide, the probability of causation estimate DOL assigns to the claim will be based on the leukemia risk model producing the highest estimate for probability of causation.

#### § 81.25 Guidelines for claims including two or more primary cancers.

For claims including two or more primary cancers, DOL will use NIOSH-IREP to calculate the estimated probability of causation for each cancer in-

dividually. Then DOL will perform the following calculation using the probability of causation estimates produced by NIOSH-IREP:

#### EQUATION 1

Calculate:  $1 - [(1 - PC_1) \times (1 - PC_2) \times \dots \times (1 - PC_n)] = PC_{\text{total}}$ ,

where  $PC_1$  is the probability of causation for one of the primary cancers identified in the claim,  $PC_2$  is the probability of causation for a second primary cancer identified in the claim, and  $PC_n$  is the probability of causation for the  $n$ th primary cancer identified in the claim.  $PC_{\text{total}}$  is the probability that at least one of the primary cancers (cancers 1 through “ $n$ ”) was caused by the radiation dose estimated for the claim when Equation 1 is evaluated based on the joint distribution of  $PC_1, \dots, PC_n$ .<sup>4</sup> DOL will use the probability of causation value calculated for  $PC_{\text{total}}$  to adjudicate the claim.

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#### § 81.30 Non-radiogenic cancers.

The following cancers are considered non-radiogenic for the purposes of EEOICPA and this part. DOL will assign a probability of causation of zero to the following cancers:

- (a) Chronic lymphocytic leukemia (ICD-9 code: 204.1)
- (b) [Reserved]

### APPENDIX A TO PART 81—GLOSSARY OF ICD-9 CODES AND THEIR CANCER DESCRIPTIONS<sup>1</sup>

ICD-9 code	Cancer description
140 .....	Malignant neoplasm of lip.
141 .....	Malignant neoplasm of tongue.
142 .....	Malignant neoplasm of major salivary glands.
143 .....	Malignant neoplasm of gum.
144 .....	Malignant neoplasm of floor of mouth.
145 .....	Malignant neoplasm of other and unspecified parts of mouth.
146 .....	Malignant neoplasm of oropharynx.
147 .....	Malignant neoplasm of nasopharynx.
148 .....	Malignant neoplasm of hypopharynx.
149 .....	Malignant neoplasm of other and ill-defined sites within the lip, oral cavity, and pharynx.
150 .....	Malignant neoplasm of esophagus.
151 .....	Malignant neoplasm of stomach.
152 .....	Malignant neoplasm of small intestine, including duodenum.
153 .....	Malignant neoplasm of colon.

<sup>4</sup>Evaluating Equation 1 based on the individual upper 99th percentiles of  $PC_1, \dots, PC_n$  approximates the upper 99th percentile of  $PC_{\text{total}}$  whenever  $PC_1, \dots, PC_n$  are highly related, e.g., when a common dose-reconstruction is the only non-negligible source of uncertainty in the individual  $PC_i$ 's. However, this approximation can overestimate it if

other sources of uncertainty contribute independently to the  $PC_1, \dots, PC_n$ , whereas treating the joint distribution as fully independent could substantially underestimate the upper 99th percentile of  $PC_{\text{total}}$  whenever the individual  $PC_i$ 's are positively correlated.